

1. A computer-readable medium for storing program data, wherein the program data comprises executable instructions for implementing a method in a first wireless station that is part of an infrastructure basic service set network, the infrastructure basic service set network also comprising an access point and a second wireless station, the wireless stations of the infrastructure basic service set network communicating on an infrastructure frequency channel, the method comprising:

determining that at least one condition is satisfied for establishing a direct link with the second wireless station for transmission of data from the first wireless station to the second wireless station;

establishing the direct link with the second wireless station on a direct link frequency channel that is different than the infrastructure frequency channel; and
transmitting the data to the second wireless station via the direct link.

2. The computer-readable medium of claim 1, wherein after the data has been transmitted to the second wireless station the method further comprises:

terminating the direct link; and
rejoining the infrastructure basic service set network.

3. The computer-readable medium of claim 1, wherein while the direct link is established between the first wireless station and the second wireless station the method further comprises periodically tuning to the infrastructure frequency channel to receive beacons from the access point.

4. The computer-readable medium of claim 3, wherein the method further comprises:
receiving a beacon that comprises a notification about downlink data for the first wireless station that is buffered at the access point;
determining whether a condition is satisfied for terminating the direct link;
if the condition is satisfied, terminating the direct link and rejoining the infrastructure basic service set network; and

- if the condition is not satisfied, tuning to the infrastructure frequency channel at scheduled time intervals to receive the downlink data from the access point.
5. The computer-readable medium of claim 3, wherein the method further comprises:
periodically tuning to the infrastructure frequency channel to receive every n th beacon;
and
if the first wireless station does not see any buffered downlink data advertised in the beacons, increasing the value of n .
 6. The computer-readable medium of claim 1, wherein the method further comprises:
obtaining unused frequency channels information about unused frequency channels near the first wireless station;
sending the unused frequency channels information to the access point; and
receiving the direct link frequency channel from the access point.
 7. The computer-readable medium of claim 1, wherein determining that the at least one condition is satisfied for establishing the direct link comprises:
determining that the number of consecutive frames that have been generated at the first wireless station and that have a same destination address exceeds a threshold value; and
determining that the destination address is in the infrastructure basic service set network.
 8. A computer-readable medium for storing program data, wherein the program data comprises executable instructions for implementing a method in a second wireless station that is part of an infrastructure basic service set network, the infrastructure basic service set network also comprising a first wireless station and an access point, the wireless stations of the infrastructure basic service set network communicating on an infrastructure frequency channel, the method comprising:

determining that at least one condition is satisfied for establishing a direct link with the first wireless station for transmission of data from the first wireless station to the second wireless station;

establishing the direct link with the first wireless station on a direct link frequency channel that is different than the infrastructure frequency channel; and
receiving the data from the first wireless station via the direct link.

9. The computer-readable medium of claim 8, wherein determining that the at least one condition is satisfied for establishing the direct link comprises:

determining that the number of consecutive frames that have been received at the second wireless station and that have a same source address exceeds a threshold value;
and

determining that the source address is in the infrastructure basic service set network.

10. A computer-readable medium for storing program data, wherein the program data comprises executable instructions for implementing a method in an access point that is part of an infrastructure basic service set network, the infrastructure basic service set network also comprising a first wireless station and a second wireless station, the wireless stations of the infrastructure basic service set network communicating on an infrastructure frequency channel, the method comprising:

receiving first unused frequency channels information about first unused frequency channels near the first wireless station;

receiving second unused frequency channels information about second unused frequency channels near the second wireless station;

using the first unused frequency channels information and the second unused frequency channels information to select a selected frequency channel that is available to both the first wireless station and the second wireless station and that is different than the infrastructure frequency channel and any other direct link frequency channels in the infrastructure basic service set network; and

transmitting the selected frequency channel to the first wireless station.

11. In a first wireless station that is part of an infrastructure basic service set network, the infrastructure basic service set network also comprising an access point and a second wireless station, the wireless stations of the infrastructure basic service set network communicating on an infrastructure frequency channel, a method comprising:

determining that at least one condition is satisfied for establishing a direct link with the second wireless station for transmission of data from the first wireless station to the second wireless station;

establishing the direct link with the second wireless station on a direct link frequency channel that is different than the infrastructure frequency channel; and
transmitting the data to the second wireless station via the direct link.

12. The method of claim 11, wherein after the data has been transmitted to the second wireless station the method further comprises:

terminating the direct link; and
rejoining the infrastructure basic service set network.

13. The method of claim 11, wherein while the direct link is established between the first wireless station and the second wireless station the method further comprises periodically tuning to the infrastructure frequency channel to receive beacons from the access point.

14. The method of claim 13, further comprising:

receiving a beacon that comprises a notification about downlink data for the first wireless station that is buffered at the access point;

determining whether a condition is satisfied for terminating the direct link;

if the condition is satisfied, terminating the direct link and rejoining the infrastructure basic service set network; and

if the condition is not satisfied, tuning to the infrastructure frequency channel at scheduled time intervals to receive the downlink data from the access point.

15. The method of claim 13, further comprising:

periodically tuning to the infrastructure frequency channel to receive every n th beacon;
and

if the first wireless station does not see any buffered downlink data advertised in the beacons, increasing the value of n .

16. The method of claim 11, further comprising:
obtaining unused frequency channels information about unused frequency channels near the first wireless station;
sending the unused frequency channels information to the access point; and
receiving the direct link frequency channel from the access point.
17. The method of claim 11, wherein determining that the at least one condition is satisfied for establishing the direct link comprises:
determining that the number of consecutive frames that have been generated at the first wireless station and that have a same destination address exceeds a threshold value; and
determining that the destination address is in the infrastructure basic service set network.
18. In a second wireless station that is part of an infrastructure basic service set network, the infrastructure basic service set network also comprising a first wireless station and an access point, the wireless stations of the infrastructure basic service set network communicating on an infrastructure frequency channel, a method comprising:
determining that at least one condition is satisfied for establishing a direct link with the first wireless station for transmission of data from the first wireless station to the second wireless station;
establishing the direct link with the first wireless station on a direct link frequency channel that is different than the infrastructure frequency channel; and
receiving the data from the first wireless station via the direct link.

19. The method of claim 18, wherein determining that the at least one condition is satisfied for establishing the direct link comprises:

- determining that the number of consecutive frames that have been received at the second wireless station and that have a same source address exceeds a threshold value;
- and
- determining that the source address is in the infrastructure basic service set network.

20. In an access point that is part of an infrastructure basic service set network, the infrastructure basic service set network also comprising a first wireless station and a second wireless station, the wireless stations of the infrastructure basic service set network communicating on an infrastructure frequency channel, a method comprising:

- receiving first unused frequency channels information about first unused frequency channels near the first wireless station;
- receiving second unused frequency channels information about second unused frequency channels near the second wireless station;
- using the first unused frequency channels information and the second unused frequency channels information to select a selected frequency channel that is available to both the first wireless station and the second wireless station and that is different than the infrastructure frequency channel and any other direct link frequency channels in the infrastructure basic service set network; and
- transmitting the selected frequency channel to the first wireless station.

21. A first wireless station that is configured to be part of an infrastructure basic service set network, the infrastructure basic service set network also comprising an access point and a second wireless station, the wireless stations of the infrastructure basic service set network communicating on an infrastructure frequency channel, the first wireless station comprising:

- a processor;
- memory in electronic communication with the processor;
- instructions stored in the memory, the instructions being executable to implement a method comprising:

determining that at least one condition is satisfied for establishing a direct link with the second wireless station for transmission of data from the first wireless station to the second wireless station;
establishing the direct link with the second wireless station on a direct link frequency channel that is different than the infrastructure frequency channel; and
transmitting the data to the second wireless station via the direct link.

22. The first wireless station of claim 21, wherein after the data has been transmitted to the second wireless station the method further comprises:

terminating the direct link; and
rejoining the infrastructure basic service set network.

23. The first wireless station of claim 21, wherein while the direct link is established between the first wireless station and the second wireless station the method further comprises periodically tuning to the infrastructure frequency channel to receive beacons from the access point.

24. The first wireless station of claim 23, wherein the method further comprises:
receiving a beacon that comprises a notification about downlink data for the first wireless station that is buffered at the access point;
determining whether a condition is satisfied for terminating the direct link;
if the condition is satisfied, terminating the direct link and rejoining the infrastructure basic service set network; and
if the condition is not satisfied, tuning to the infrastructure frequency channel at scheduled time intervals to receive the downlink data from the access point.

25. The first wireless station of claim 23, wherein the method further comprises:
periodically tuning to the infrastructure frequency channel to receive every n th beacon;
and

if the first wireless station does not see any buffered downlink data advertised in the beacons, increasing the value of n .

26. The first wireless station of claim 21, wherein the method further comprises:
obtaining unused frequency channels information about unused frequency channels near the first wireless station;
sending the unused frequency channels information to the access point; and
receiving the direct link frequency channel from the access point.

27. The first wireless station of claim 21, wherein determining that the at least one condition is satisfied for establishing the direct link comprises:

determining that the number of consecutive frames that have been generated at the first wireless station and that have a same destination address exceeds a threshold value; and

determining that the destination address is in the infrastructure basic service set network.

28. A second wireless station that is configured to be part of an infrastructure basic service set network, the infrastructure basic service set network also comprising a first wireless station and an access point, the wireless stations of the infrastructure basic service set network communicating on an infrastructure frequency channel, the second wireless station comprising:

a processor;

memory in electronic communication with the processor;

instructions stored in the memory, the instructions being executable to implement a method comprising:

determining that at least one condition is satisfied for establishing a direct link with the first wireless station for transmission of data from the first wireless station to the second wireless station;

establishing the direct link with the first wireless station on a direct link frequency channel that is different than the infrastructure frequency channel; and

receiving the data from the first wireless station via the direct link.

29. The second wireless station of claim 28, wherein determining that the at least one condition is satisfied for establishing the direct link comprises:

determining that the number of consecutive frames that have been received at the second wireless station and that have a same source address exceeds a threshold value;
and
determining that the source address is in the infrastructure basic service set network.

30. An access point that is configured to be part of an infrastructure basic service set network, the infrastructure basic service set network also comprising a first wireless station and a second wireless station, the wireless stations of the infrastructure basic service set network communicating on an infrastructure frequency channel, the access point comprising:

a processor;
memory in electronic communication with the processor;
instructions stored in the memory, the instructions being executable to implement a method comprising:
receiving first unused frequency channels information about first unused frequency channels near the first wireless station;
receiving second unused frequency channels information about second unused frequency channels near the second wireless station;
using the first unused frequency channels information and the second unused frequency channels information to select a selected frequency channel that is available to both the first wireless station and the second wireless station and that is different than the infrastructure frequency channel and any other direct link frequency channels in the infrastructure basic service set network; and
transmitting the selected frequency channel to the first wireless station.